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(54) **ORGANIC LIGHT EMITTING DISPLAY ILLUMINATING APPARATUS**

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(51) **Int. Cl.**

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F21V 23/02	(2006.01)
F21V 15/01	(2006.01)
F21V 17/10	(2006.01)
F21W 131/103	(2006.01)
F21Y 105/00	(2016.01)
H01R 13/08	(2006.01)

(52) **U.S. Cl.**

CPC ***F21V 23/023*** (2013.01); ***F21V 15/01*** (2013.01); *F21V 17/104* (2013.01); *F21V 17/105* (2013.01); *F21W 2131/103* (2013.01); *F21Y 2105/008* (2013.01); *H01R 13/08* (2013.01); *Y02B 20/36* (2013.01)

(58) **Field of Classification Search**

None

See application file for complete search history.

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(57) **ABSTRACT**

Embodiments may be directed to an OLED illuminating apparatus including a lamp unit including a panel with an organic emission unit, a connection terminal electrically connected to the organic emission unit, and a housing coupled to the panel, the housing including a relay terminal that is electrically connected to the connection terminal; and a supporting unit detachably coupled to the lamp unit, the supporting unit supporting the lamp unit and supplying electric power to the organic emission unit by connecting to the relay terminal when coupled to the lamp unit.

11 Claims, 5 Drawing Sheets

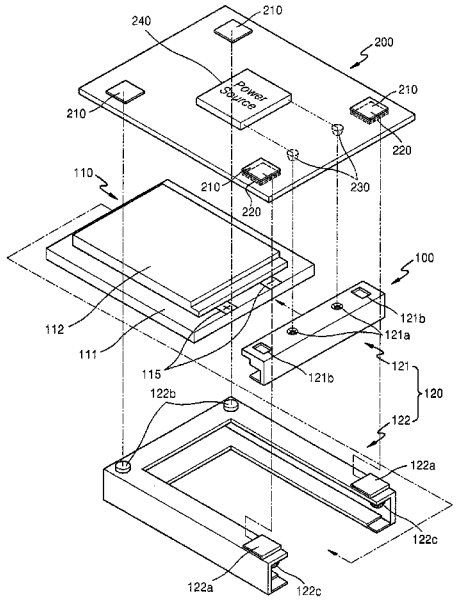


FIG. 1

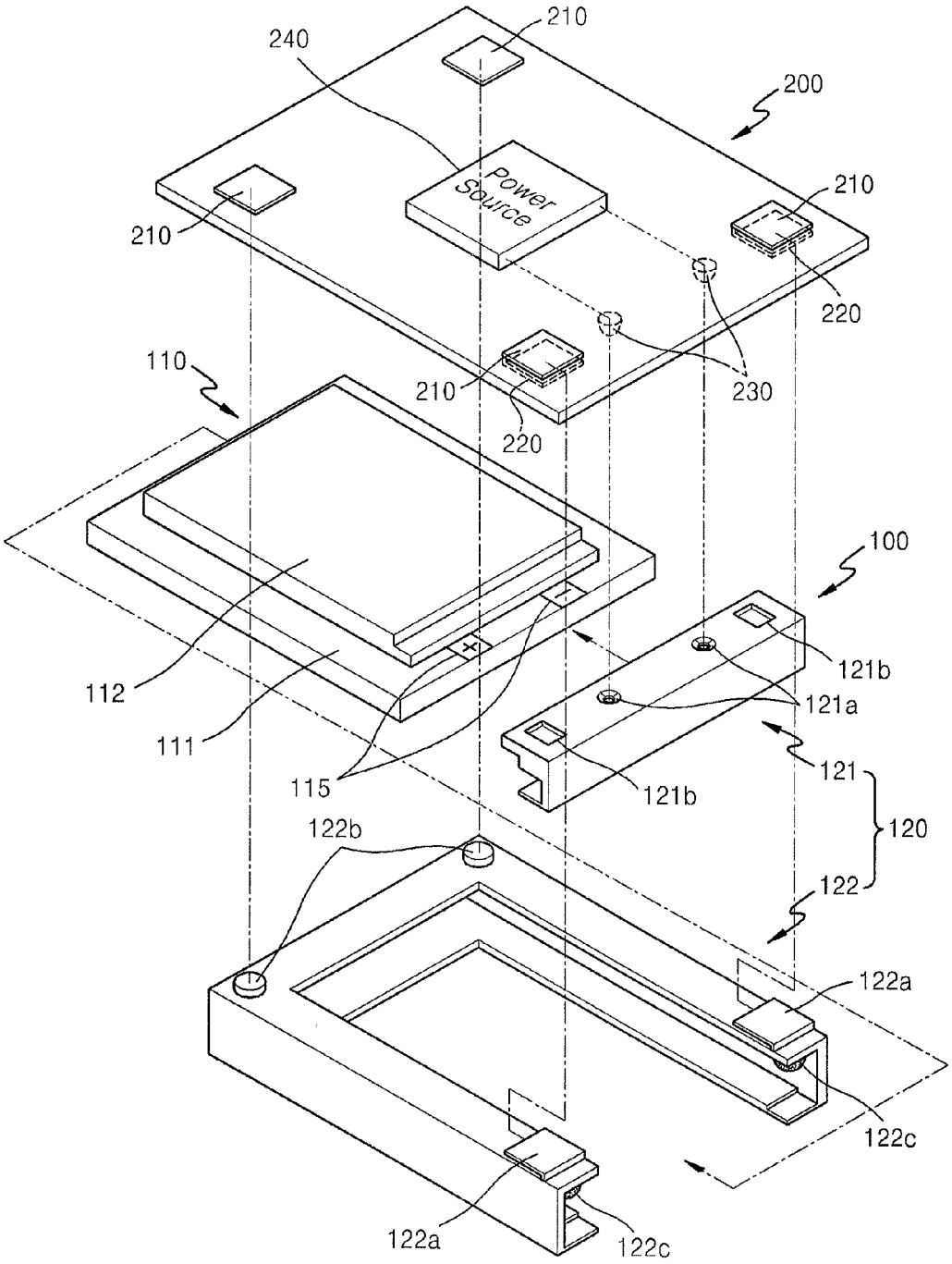

210
240
200
Power Source
210
210
220
230
210
220
110
100
121b
121a
112
111
115
121b
121
120
122b
122
122a
122c
122a
122c

FIG. 2

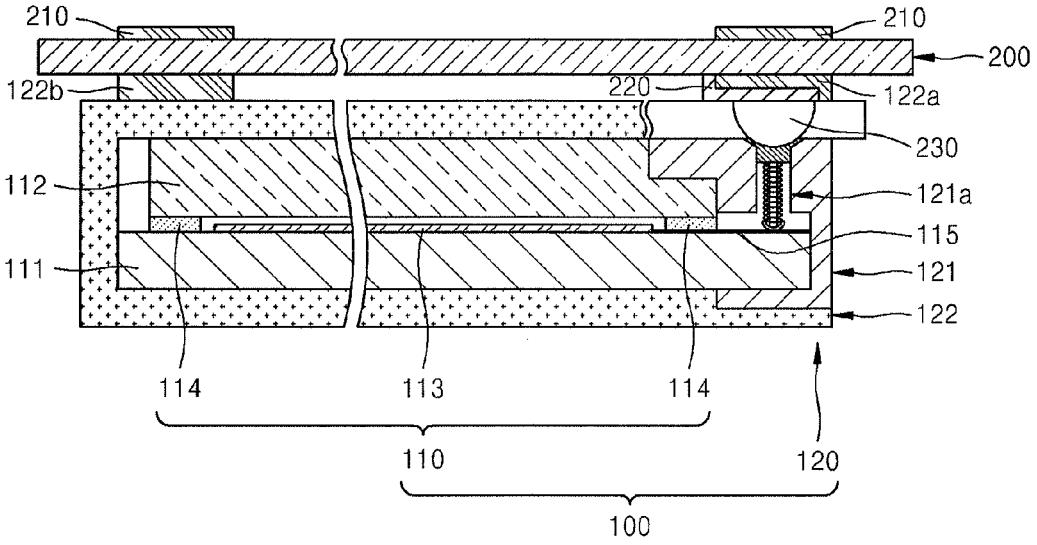

210
210
200
122b
220
122a
230
112
121a
115
111
121
122
114
113
114
110
120
100

FIG. 3

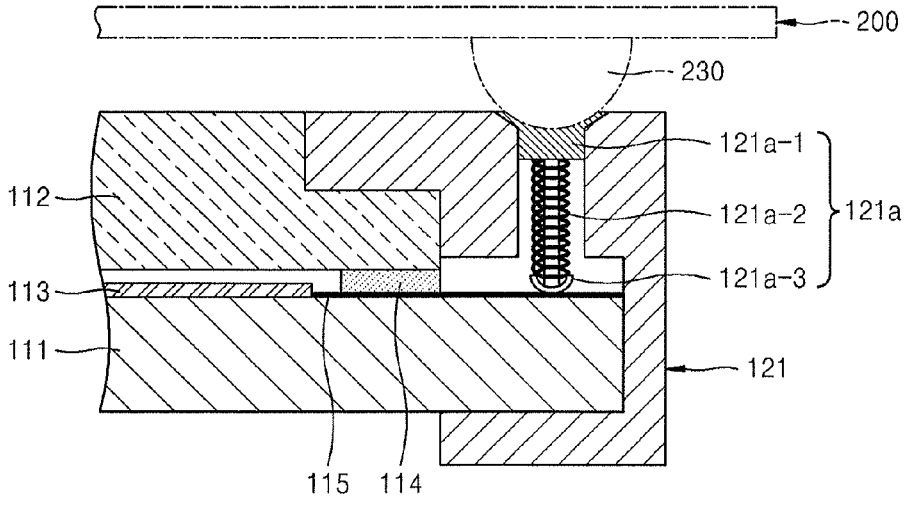

200
230
121a-1
112
121a-2
121a
113
121a-3
111
121
115
114

FIG. 4

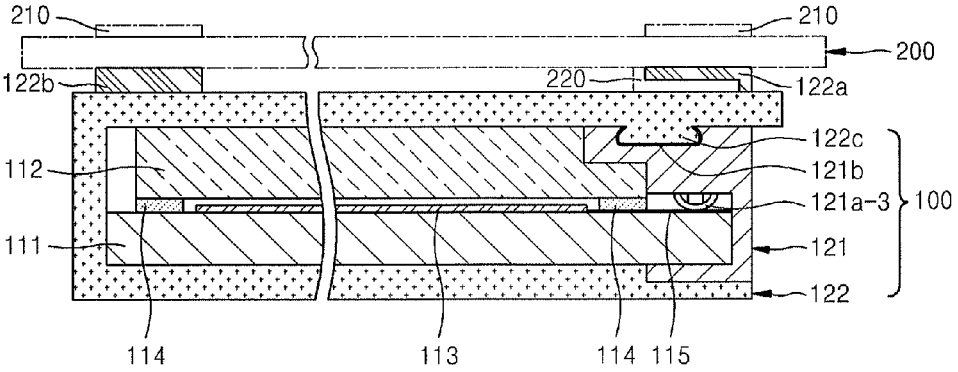


FIG. 5A

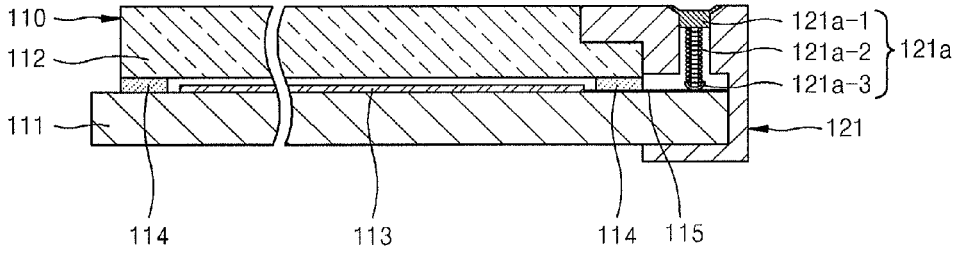


FIG. 5B

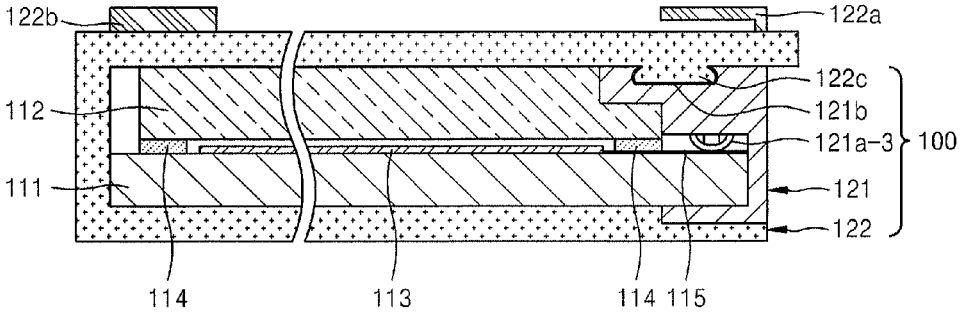


FIG. 5C

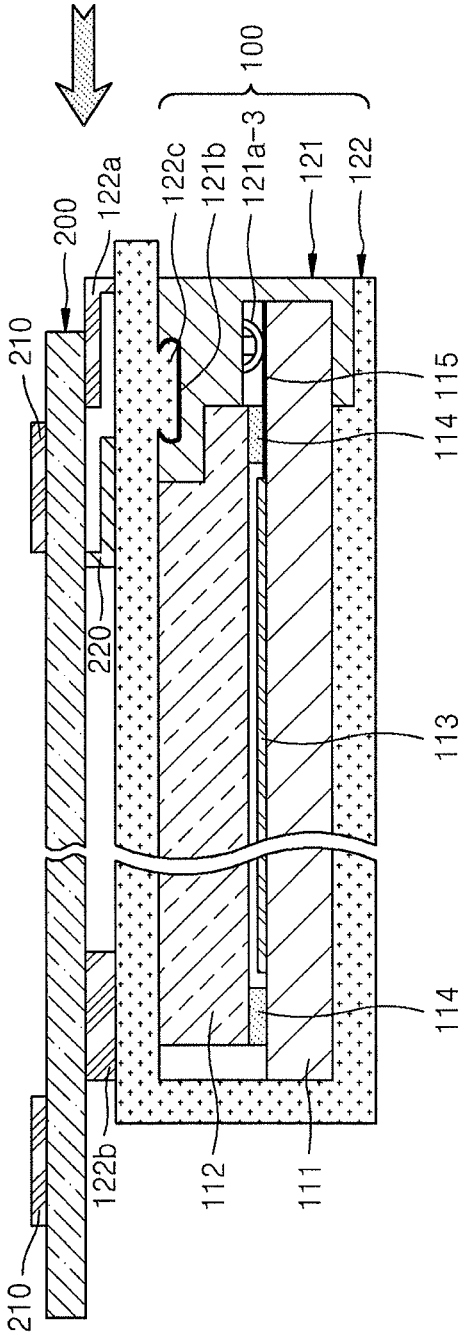
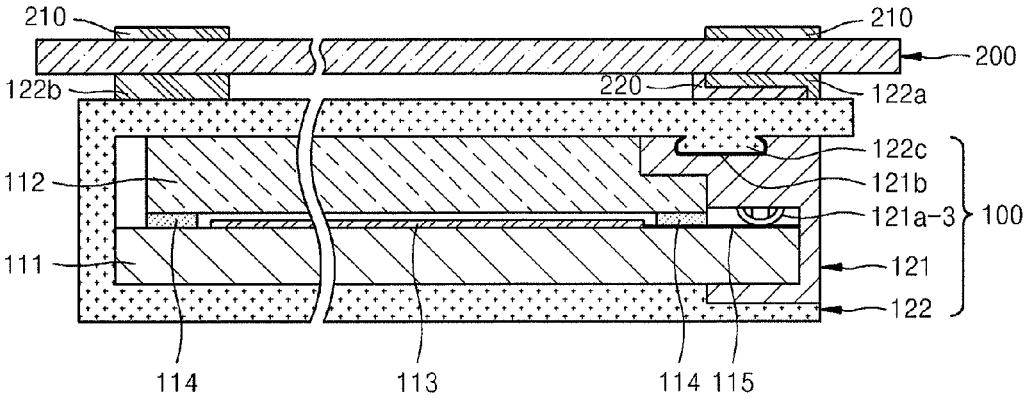

100
121a-3
122c
121b
121
122
122a
200
210
114 115
220
113
114
112
111
122b
210

FIG. 5D


210
210
200
122b
220
122a
122c
112
121b
121a-3
100
111
121
122
114
113
114
115

ORGANIC LIGHT EMITTING DISPLAY ILLUMINATING APPARATUS

CROSS-REFERENCE TO RELATED PATENT APPLICATION

This application claims the benefit of Korean Patent Application No. 10-2011-0048504, filed on May 23, 2011, in the Korean Intellectual Property Office, the disclosure of which is incorporated herein in its entirety by reference.

BACKGROUND

1. Field

Embodiments relate to an illuminating apparatus using an organic light emitting display (OLED).

2. Description of the Related Art

In general, organic light emitting displays (OLEDs) emit light when holes and electrons, injected through an anode and a cathode, recombine with each other in a light emission layer disposed between the anode and the cathode. When the OLED is applied to an illuminating apparatus, the illuminating apparatus may emit light with high brightness.

SUMMARY

Embodiments are directed to an organic light emitting display (OLED) illuminating apparatus.

According to an embodiment, there may be an organic light emitting display (OLED) illuminating apparatus including: a lamp unit including a panel with an organic emission unit, a connection terminal electrically connected to the organic emission unit, and a housing coupled to the panel, the housing unit including a relay terminal that is electrically connected to the connection terminal; and a supporting unit detachably coupled to the lamp unit, the supporting unit supporting the lamp unit and supplying electric power to the organic emission unit by connecting to the relay terminal when coupled to the lamp unit.

The housing may include: a first housing including the relay terminal and installed on a portion of a circumferential surface of the panel; and a second housing installed to surround a remaining portion of the circumferential surface of the panel.

The first housing and the second housing may be formed of elastic insulating materials.

The first housing and the second housing may be detachably coupled to each other via a first coupling unit.

The first coupling unit may include a coupling recess formed in the first housing and a coupling hook formed on the second housing so as to be elastically inserted into the coupling recess.

The supporting unit may be detachably coupled to the lamp unit via the second housing and a second coupling unit.

The second coupling unit may include a plurality of magnetic bodies installed on the supporting unit and the second housing so as to be magnetically coupled to each other. The second coupling unit may further include a first slide rib on the supporting unit, and a second slide rib on the second housing, the first and second slide ribs being slidable into and out of a coupling engagement with each other.

The second slide rib may include a magnetic body.

The relay terminal may include: a head portion fixed in the first housing; a moveable pin having a first end moveably inserted into the head portion and a second end contacting the connection terminal; and a spring for providing an elastic force toward a direction in which the second end of the moveable pin contacts the connection terminal.

The supporting unit may include a power supply protrusion connecting to a power source so that the power supply protrusion is connected to the head portion of the relay terminal when the lamp unit and the supporting unit are coupled to each other.

BRIEF DESCRIPTION OF THE DRAWINGS

The above and other features will become more apparent by describing in detail exemplary embodiments thereof with reference to the attached drawings in which:

FIG. **1** is an exploded perspective view of an organic light emitting display (OLED) illuminating apparatus according to an embodiment;

FIG. **2** is a cross-sectional view of a coupling status of the OLED illuminating apparatus shown in FIG. **1**;

FIG. **3** is a cross-sectional view showing a power source connecting structure in the OLED illuminating apparatus shown in FIG. **1**;

FIG. **4** is a cross-sectional view of a coupling structure of a housing in the OLED illuminating apparatus shown in FIG. **1**; and

FIGS. **5**A through **5**D are cross-sectional views illustrating assembling processes of the OLED illuminating apparatus shown in FIG. **1**.

DETAILED DESCRIPTION

Example embodiments will now be described more fully hereinafter with reference to the accompanying drawings; however, they may be embodied in different forms and should not be construed as limited to the embodiments set forth herein.

FIGS. **1** and **2** are diagrams showing an organic light emitting display (OLED) illuminating apparatus respectively in a disassembled state and a coupling state, according to an embodiment.

Referring to FIGS. **1** and **2**, the OLED illuminating apparatus of the present embodiment includes a lamp unit **100** emitting light, and a supporting unit **200** supporting the lamp unit **100**.

In other words, the lamp unit **100** generates light required to illuminate, and the supporting unit **200** stably supports the lamp unit **100** at a predetermined position.

The lamp unit **100** will be described as follows. As shown in FIG. **2**, the lamp unit **100** includes a panel **110** that includes a first substrate **111** on which an organic emission unit **113** is formed, and a second substrate **112** coupled to the first substrate **111** in a state where a sealant **114** is disposed between the first and second substrates **111** and **112** to seal the organic emission unit **113**. When a voltage is applied to an anode (not shown) and a cathode (not shown) disposed in the organic emission unit **113**, an organic emission layer (not shown) disposed between the anode and the cathode emits light toward a circumference. A connection terminal **115** is formed on the first substrate **111** to connect a power source **240** to electrodes of the organic emission unit **113**.

In addition, a housing **120** surrounds the panel **110**. The housing **120** includes a first housing **121** installed on a portion of a circumferential surface of the panel **110** and a second housing **122** surrounding a remaining portion of the circumferential surface of the panel **110**.

The first housing **121** is formed on the portion of the circumferential surface of the panel **110**, on which the connection terminal **115** is installed. The first housing **121** includes

a relay terminal **121***a* that is electrically connected to the connection terminal **115**. As shown in FIG. **3**, the relay terminal **121***a* includes a head portion **121***a*-**1** fixed in the first housing **121**, a movable pin **121***a*-**3** having an end portion that is moveably inserted in the head portion **121***a*-**1** and the other end portion contacting the connection terminal **115**, and a spring **121***a*-**2** providing an elastic force in a direction in which the other end portion of the moveable pin **121***a*-**3** contacts the connection terminal **115**. When the lamp unit **100** and the supporting unit **200** are coupled to each other, the head portion **121***a*-**1** of the relay terminal **121** contacts a power supply protrusion **230** of the supporting unit **200**. In other words, the power supply protrusion **230** and the connection terminal **115** are electrically connected to each other via the relay terminal **121***a*.

The second housing **122** is installed to surround the circumferential surfaces of the panel **110**, except for the circumferential surface on which the first housing **121** is installed. The second housing **122** is detachably coupled to the first housing **121** by a first coupling unit.

As shown in FIGS. **1** and **4**, the first coupling unit may include a coupling recess **121***b* formed in the first housing **121**, and a coupling hook **122***c* formed on the second housing **122** so as to be elastically inserted in the coupling recess **121***b*. In other words, the coupling hook **122***c* of the second housing **122** is inserted into the coupling recess **121***b* of the first housing **121** and elastically locked in the coupling recess **121***b*. Accordingly, the first and second housings **121** and **122** are coupled to form the housing **120**. The first and second housings **121** and **122** may be formed of an elastic insulating material, i.e., rubber, for ensuring an elasticity and electrical insulating property.

As described above, when the lamp unit **100** is assembled by coupling the first and second housings **121** and **122** to the panel **110**, the lamp unit **100** is detachably coupled to the coupling unit **200** by a second coupling unit.

As shown in FIGS. **1** and **4**, the second coupling unit may include a plurality of magnetic bodies **122***b* and **210** disposed on the second housing **122** and the supporting unit **200**. For example, a permanent magnet may be installed on an upper surface of the supporting unit **200** as the magnetic body **210**. A metal member, i.e., iron (Fe), that may be magnetically coupled to the permanent magnet may be installed on an upper surface of the second housing **122**. Accordingly, the lamp unit **100** and the supporting unit **200** are coupled to each other by the coupling of the magnetic bodies **122***b* and **210**, and may be easily separated from each other. The installation locations of the permanent magnet and the metal member may be switched.

In addition, for stably coupling the lamp unit **100** and the supporting unit **200** to each other, first and second slide ribs **220***a* and **122***a* are formed. In other words, the first slide rib **220** and the second slide rib **122***a* are coupled to each other, and form an "L"-shape, as they slide into each other. At the same time, the magnetic coupling of the magnetic bodies **210** and **122***b* allows the coupling between the lamp unit **100** and the supporting unit **200** to be firm. The second slide rib **122***a* may be formed of a magnetic material. Thus, after being coupled to the first slide rib **220**, the second slide rib **122***a* is magnetically coupled to the magnetic body **210** of the supporting unit **200**.

As shown in FIGS. **1** and **3**, when the supporting unit **200** and the lamp unit **100** are coupled to each other by the second coupling unit, the head portion **121***a*-**1** of the relay terminal **121***a* contacts the power supply protrusion **230** of the supporting unit **200**. Consequently, the connection terminal **115** connecting to the organic emission unit **115** and the power source **240** are electrically connected to each other.

The coupling processes of the lamp unit **100** and the supporting unit **200** are performed as shown in FIGS. **5**A through **5**D.

Referring to FIG. **5**A, the first housing **121** is coupled to the circumferential surface of the panel **110**. The relay terminal **121***a* installed on the first housing **121** is electrically connected to the connection terminal **115** formed on the panel **110**.

As shown in FIG. **5**B, the second housing **122** that surrounds remaining circumferential surfaces of the panel **110** is coupled to the first housing **121**. The coupling hook **122***c* of the second housing **122** is elastically inserted into the coupling recess **121***b* of the first housing **121** and locked.

After assembling the lamp unit **100**, the first and second slide ribs **220** and **122***a* slide into each other and couple to each other. Thus, as shown in FIG. **5**C, the lamp unit **100** is coupled to the supporting unit **200**.

As shown in FIG. **5**D, the lamp unit **100** and the supporting unit **200** are coupled to each other. The coupling state of the lamp unit **100** and the supporting unit **200** may be firmly maintained by the magnetic coupling between the magnetic bodies **122***a*, **122***b*, and **210**. In addition, the power source **240**, the power supply protrusion **230**, the relay terminal **121***a*, and the connection terminal **115** are electrically connected to each other so as to supply the electric current to the organic emission unit **113**.

When the lamp unit **100** is assembled by coupling the housing **120** to the panel **110** and the lamp unit **100** is coupled to the supporting unit **200**, placing of the lamp unit **100** and the electric connection between the power source **240** and the organic emission unit **113** are performed easily. Thus, replacement of the lamp unit **100** may be conveniently performed.

When the lamp unit **100** is separated from the supporting unit **200**, the lamp unit **100** is pulled with a force that is slightly greater than the coupling force between the magnetic bodies **122***a*, **122***b*, and **210**. Thus, the lamp unit **100** and the supporting unit **200** are easily separated. In addition, the elastic locking between the panel **110** and the housing **120** is released when the coupling hook **122***c* is pulled out of the coupling recess **121***b*, and the panel **110** and the housing **120** are isolated from each other. Accordingly, the separation and mounting may be performed quickly and conveniently.

By way of summation and review, in order to realize an illuminating apparatus (i.e., street lamp or indoor lamp) with an OLED, a lamp and a supporting unit need to be coupled to each other in a convenient and stable manner. The lamp unit is a light emitting portion and the supporting unit supports the lamp unit. In the illuminating apparatus, the lamp unit is frequently replaced because of damage to the lamp unit and the lifespan of the lamp unit. Thus, the illuminating apparatus may have a disadvantage if it is difficult to couple the lamp unit and the supporting unit to each other. The illuminating apparatus may also have another disadvantage if it is difficult to separate the lamp unit and the supporting unit from each other.

Embodiments are directed to an organic light emitting display (OLED) illuminating apparatus having an improved coupling structure between a lamp unit and a supporting unit. Embodiments are also directed to the OLED illuminating apparatus having an improved connecting structure between the lamp unit and the supporting unit.

According to the OLED illuminating apparatus of the embodiments, the coupling and separating operations of the lamp unit and the supporting unit may be easily and stably

performed. Thus, maintenance of the OLED illuminating apparatus may be conveniently performed.

Exemplary embodiments have been disclosed herein, and although specific terms are employed, they are used and are to be interpreted in a generic and descriptive sense only and not for purpose of limitation.

What is claimed is:

1. An organic light emitting display (OLED) illuminating apparatus comprising:

a lamp unit including a panel with an organic emission unit, a connection terminal electrically connected to the organic emission unit, and a housing coupled to the panel, the housing including a relay terminal that is electrically connected to the connection terminal; and

a supporting unit detachably coupled to the lamp unit, the supporting unit supporting the lamp unit and supplying electric power to the organic emission unit by connecting to the relay terminal when coupled to the lamp unit.

2. An organic light emitting display (OLED) illuminating apparatus comprising:

a lamp unit including a panel with an organic emission unit, a connection terminal electrically connected to the organic emission unit, and a housing coupled to the panel, the housing including a relay terminal that is electrically connected to the connection terminal; and

a supporting unit detachably coupled to the lamp unit, the supporting unit supporting the lamp unit and supplying electric power to the organic emission unit by connecting to the relay terminal when coupled to the lamp unit,

wherein the housing includes:

a first housing including the relay terminal and installed on a portion of a circumferential surface of the panel; and

a second housing installed to surround a remaining portion of the circumferential surface of the panel.

3. The OLED illuminating apparatus as claimed in claim **2**, wherein the first housing and the second housing are formed of elastic insulating materials.

4. The OLED illuminating apparatus as claimed in claim **2**, wherein the first housing and the second housing are detachably coupled to each other via a first coupling unit.

5. The OLED illuminating apparatus as claimed in claim **4**, wherein the first coupling unit includes a coupling recess formed in the first housing and a coupling hook formed on the second housing so as to be elastically inserted into the coupling recess.

6. The OLED illuminating apparatus as claimed in claim **2**, wherein the supporting unit is detachably coupled to the lamp unit via the second housing and a second coupling unit.

7. The OLED illuminating apparatus as claimed in claim **6**, wherein the second coupling unit includes a plurality of magnetic bodies installed on the supporting unit and the second housing so as to be magnetically coupled to each other.

8. The OLED illuminating apparatus as claimed in claim **7**, wherein the second coupling unit further includes a first slide rib on the supporting unit, and a second slide rib on the second housing, the first and second slide ribs being slidable into and out of a coupling engagement with each other.

9. The OLED illuminating apparatus as claimed in claim **8**, wherein the second slide rib includes a magnetic body.

10. The OLED illuminating apparatus as claimed in claim **2**, wherein the relay terminal includes:

a head portion fixed in the first housing;

a moveable pin having a first end moveably inserted into the head portion and a second end contacting the connection terminal; and

a spring for providing an elastic force toward a direction in which the second end of the moveable pin contacts the connection terminal.

11. The OLED illuminating apparatus as claimed in claim **10**, wherein the supporting unit includes a power supply protrusion connecting to a power source so that the power supply protrusion is connected to the head portion of the relay terminal when the lamp unit and the supporting unit are coupled to each other.

* * * * *